

**ISSUANCE OF A GENERAL VPDES PERMIT
FOR COOLING WATER DISCHARGES**

The Virginia State Water Control Board has developed a general VPDES permit for point source discharges of cooling water to municipal separate storm sewer systems and surface waters.

Permit Number: VAG25

Name of Permittee: Any owner of a cooling water discharge in the Commonwealth of Virginia agreeing to be regulated under the terms of this general permit.

Facility Location: Commonwealth of Virginia

Receiving Waters: Surface waters within the boundaries of the Commonwealth of Virginia, except Class V stockable waters, Class VI natural trout waters, and those specifically named in Board Regulations or policies which prohibit such discharges. Discharge to surface waters may be through a municipal separate storm sewer system. Chlorine or any other halogen compounds shall not be used for disinfection or other treatment purposes, including biocide applications, for any discharges to waters containing endangered or threatened species as identified in 9 VAC 25-260-110 C of the Water Quality Standards.

The State Water Control Board adopted the general VPDES permit regulation January 6, 2003, with an effective date of March 2, 2003. Non-contact cooling water discharges are similar in composition even though they may not be generated by a single industrial category or point source. The Department of Environmental Quality has determined that this type of discharge is appropriately controlled under a general permit. The draft general permit requires that all covered facilities meet standardized effluent limitations and monitoring requirements.

All pertinent information is on file and may be inspected, and arrangements made for copying by contacting Jon van Soestbergen at:

Virginia Department of Environmental Quality
P.O. Box 10009
Richmond, Virginia 23240-0009
(804) 698- 4117

Activities Covered By This General Permit And Sources Of Wastewater

This general permit covers point source discharges of cooling water and cooling equipment blowdown to surface waters. Discharge to surface waters may be through a municipal separate storm sewer system (MS4).

"Cooling Water" means water used to reduce temperature which does not come into direct contact with any raw product, intermediate product (other than heat) or finished product. For the purposes of this general permit, cooling water can be generated from any cooling equipment blowdown or produced as a result of any non-contact cooling process through either a single pass (once through) or recirculating system. "Blowdown" is a discharge of recirculating water from any cooling equipment or cooling process in order to maintain a desired quality of the recirculating water. Water which is used for cooling purposes and which commingles with a wastewater or process fluid becomes process wastewater and is not covered by this general permit. Boiler blowdown and storm water discharges are also excluded from the coverage of this general permit.

This general permit is not applicable for a category where effluent guidelines have been promulgated, such as steam electric generating stations (see 40 CFR Part 423).

The cooling water's source can be a well, surface water, or the potable water supply. The water is used in a process for cooling. The temperature control system operates so that the cooling water does not come into direct contact with the raw materials. The primary pollutant associated with cooling equipment blowdown and non-contact cooling water discharges is the heat taken up by the water. In one pass cooling water facilities, after the heat transfer has taken place, the water is discharged. Once-through cooling generates relatively large volumes of water. In most cases, the water passes through the heat exchange apparatus and is discharged without chemical additives or treatment.

Other cooling equipment, such as cooling towers, use less water because they usually operate in a recycle, rather than once-through, mode. Generally associated with air conditioning units, cooling towers are used to remove heat from a fluid by evaporating water. Water is dispersed over a media or trickled through shallow pans as air is blown over it. Evaporation cools the water down to the ambient air temperature. The cool water is then piped to a heat exchanger within the air conditioning chiller where it absorbs the heat released as freon is condensed. The cycle is completed when the water is pumped back to the cooling tower. A certain amount of the water in the cooling equipment system must be replaced during each or several cycles in order to maintain the desired properties of the water. This type of discharge (blowdown) is usually lower in volume than the once-through cooling discharge, but it has a greater potential to contain pollutants. The reuse of water usually requires some sort of treatment to inhibit corrosion and scale build-up, to reduce biological growth, and to reduce deposition of water impurities in the system. Chemical and/or non-chemical treatment may be employed to address these problems.

Due to the concern that tributyltin compounds are not easily degradable and thus have long-lasting residual effects, and the stringent water quality standards for tributyltin (0.026 ppb in freshwater and 0.001 ppb in saltwater), discharges that use biocides containing tributyltin will be excluded from the coverage of this general permit. In addition, this general permit will not cover any cooling water discharges that use hexavalent chromium (Cr^{+6})-based water treatment chemicals in the cooling water system. This restriction is imposed based on the provision promulgated under 40 CFR Part 749 that prohibits the use of hexavalent chromium-based water treatment chemicals in comfort cooling towers (CCT's). Although CCT's are dedicated exclusively to, and are an integral part of heating, ventilation, and air conditioning (HVAC) or refrigeration systems, it is anticipated that the majority of the cooling water discharges covered by this general permit will be generated from CCT's. In order to assure compliance with the halogen ban of 9 VAC 25-260-110 of the Water Quality Standards, chlorine or any other halogen compounds are not allowed to be used for disinfection or other treatment purposes, including biocide applications, for any discharges to water containing endangered or threatened species as identified in 9 VAC 25-260-110 C of the Water Quality Standards.

As a non-chemical treatment alternative, an ion generator is commonly employed in the cooling water system. DC current is passed through anodes made of copper and silver alloy. This process releases copper and silver ions into the water. The ions neutralize bacteria and algae. Other non-chemical treatment alternatives, such as magnetic descaling which reduces the scale build-up by creating alternating magnetic fields, may require alternative treatment for control of biological growth. Either a silver/copper anode unit or chlorine addition may serve this purpose.

Due to the concern that toxic effects could occur as a result of contaminated water sources from groundwater remediation wells, discharges that use groundwater remediation wells as cooling water source will be excluded from the coverage of this general permit.

The cooling water discharges normally do not include a treatment system. However, retention or settling ponds may be used to equalize the flow, lower the temperature, or to settle any possible solids that may occur in the discharge.

Effluent Limitations and Monitoring Requirements

| <u>Parameter</u> | <u>Limitation</u> |
|---|---|
| Flow | 0.05 MGD maximum |
| Temperature | Maximum ⁽¹⁾ |
| pH | 6.0 minimum, 9.0 maximum ⁽²⁾ |
| Total Residual Chlorine ⁽³⁾ | Non-detectable max. |
| Ammonia-N ⁽³⁾ | No limit, monitoring required |
| Hardness | No limit, monitoring required |
| Total Dissolved Copper ⁽⁴⁾ | " " " |
| Total Dissolved Zinc ⁽⁴⁾ | " " " |
| Total Dissolved Silver ^(4,5) | " " " |
| Total Phosphorus ⁽⁶⁾ | " " " |

All monitoring is once per three months by grab sample, except for temperature, by immersion/stabilization.

- (1) The effluent temperature shall not exceed a maximum 32 °C for discharges to non-tidal coastal and piedmont waters, or 31 °C for mountain and upper piedmont waters. No maximum temperature limit, only monitoring, applies to discharges to estuarine waters.

The effluent shall not cause an increase in temperature of the receiving stream of more than 3 °C above the natural water temperature. The effluent shall not cause the temperature in the receiving stream to change more than 2 °C per hour.

Natural temperature is defined as that temperature of a body of water (measured as the arithmetic average over one hour) due solely to natural conditions without the influence of any point-source discharge.

- (2) Where the Water Quality Standards (9 VAC 25-260-5 et seq.) establish alternate standards for pH in the waters receiving the discharge, those standards shall be the maximum and minimum effluent limitations.
- (3) Chlorine limitation of non-detectable (<0.1 mg/l) and monitoring only apply to outfalls directly discharging to surface waters and are required where the source or cooling water is chlorinated. Ammonia_N monitoring applies only where the source or cooling water is disinfected using chloramine.
- (4) A specific analysis is not specified for these materials. An appropriate analysis shall be selected from the following list of EPA methods to achieve a quantification level that is less than the target level for the material under consideration:

| | <u>EPA Method</u> | <u>Target Level(µg/l)</u> |
|--------|---|---------------------------|
| Copper | 220.1, 220.2, 200.7, 200.8, 200.9, 1638, 1640 | 9.2 |
| Zinc | 289.1, 289.2, 200.7, 200.8, 1638, 1639 | 65.0 |
| Silver | 272.1, 272.2, 200.7, 200.8, 200.9, 1638 | 1.2 |

Quality control/assurance information shall be submitted to document that the required quantification level has been attained.

- (5) Total dissolved silver monitoring is only required where a Cu/Ag anode is used as a non-chemical treatment alternative.
- (6) Phosphorus monitoring is only required where additive containing phosphorus is used.

Basis For Effluent Limitations And Monitoring Requirements

Technology-Based Effluent Limitations

EPA has not promulgated National Effluent Guidelines for non-contact cooling water discharges. For a category where Guidelines have been promulgated, such as steam electric generating stations, the issuance of an individual permit for the discharges would be more appropriate. (See 9 VAC 25-31-170 B. 3. a.(3)).

Water Quality-Based Effluent Limitations

Water quality-based limitations for the following three parameters are imposed in this general VPDES permit: pH, temperature, and total residual chlorine (TRC).

The pH limitation is based upon the Water Quality Standards (9 VAC 25-260-5 et seq.). There shall be no change from background conditions that would impair any uses assigned to the receiving streams.

Because of the concern of excess heat from cooling water discharges, once through systems in particular, a respective temperature limit for non-tidal coastal and piedmont waters or mountainous waters, based on the Virginia Water Quality Standards (9 VAC 25-260-50) is placed in the permit. Restrictions on rise above natural temperature and maximum hourly temperature change are also imposed. In order to ensure that the stringent temperature standards for put and take trout waters and natural trout waters will be maintained, cooling water discharges to these receiving streams will not be covered by this general permit, rather be covered by an individual permit.

The general permit contains a TRC limit of non-detectable (<0.1 mg/l) in order to ensure that the Water Quality Standards (9 VAC 25-260-140) are maintained regardless of the dilution available to the discharge. The selection of the non-detectable limit, rather than the numerical standard itself which is below the detection level, is consistent with other VPDES permits issued by the Board. Total residual chlorine limitation and monitoring are required for facilities where the following conditions prevail: 1) There is a direct discharge to surface waters; and 2) The source of cooling water is chlorinated. For cooling water discharges to the MS4s, it is anticipated that dissipation in the cooling process and chlorine demand in the MS4s will reduce the residual chlorine to "de minimis" level. For any cooling water discharges to waters containing endangered and threatened species as identified in the Water Quality Standards (9 VAC 25-260-110 C.), chlorine or any other halogen compounds are not allowed to be used in the cooling water system.

Toxics Considerations

Due to the concern that the use of corrosion inhibitors and/or biocides may be allowed through this general permit, and that metals could be discharged and thus the quality of the receiving stream could be impacted, a maximum flow of 0.05 MGD is imposed in this general permit. It is the opinion of the Department that a larger discharge would need to be monitored on a more frequent basis and need additional controls, and it would be more appropriate to be covered by an individual permit. This approach is also consistent with the agency's Toxics Management Program.

Further assessment of the need for toxicity monitoring requirements for the restricted flow discharges (< 0.05 MGD) was performed by conducting an in-house review of toxicity test data for non-contact cooling water

discharges (with or without additives). It showed that 94% of acute toxicity tests had an LC₅₀ greater than or equal to 100% effluent. It was concluded that these types of discharges, in general, are not acutely toxic. The report also showed that 75% of chronic toxicity tests had a no observed effect concentration (NOEC) greater than or equal to 100% effluent, which is the worst case of the instream waste concentration (IWC). These results indicate that both acute and chronic tests passed the decision criteria (75% of the tests) established by the Toxic Management Program. Therefore, additional toxicity monitoring is not imposed in this general permit.

The following parameters are required to be monitored without specific limitations: Hardness, Total Dissolved Copper, Total Dissolved Zinc, and Total Phosphorus. These parameters were selected after reviewing results of a cooling tower effluent characterization study conducted by the Hampton Roads Sanitation District (HRSD) and the Hampton Roads Planning District Commission (HRPDC). Monitoring of phosphorous is only required where additives containing such chemical are used. In order to anticipate the use of Cu/Ag anode as a non-chemical treatment method, the general permit also contains the monitoring requirement for Total Dissolved Silver wherever a Cu/Ag anode is used. Toxic effects could occur as a result of toxic source water or due to dissolution of the piping in the cooling water system. The monitoring requirements should address this concern. The monitoring requirements will provide additional effluent data which will be used to evaluate the need for future effluent limits.

Special Conditions and Their Basis

1. Restriction of floating solids and visible foam discharges

This condition is required to implement the Water Quality Standards (9 VAC 25-260-20).

2. Prohibition of any discharges other than cooling water as defined

The effluent limitations do not address pollutants typical of treated sewage, process wastewater, or storm water discharges, therefore no discharges other than cooling water as defined are permitted under the general permit.

3. Prohibition of unapproved chemical usage and prior approval requirement for change of treatment technology

In order to assure protection of water quality and beneficial uses of the waters receiving the discharge, the use of any chemical additives not identified in the registration statement, except chlorine, without prior approval is prohibited under this general permit. The general permit contains a water quality-based chlorine limitation.

The chemical and/or non-chemical treatment that are employed in the cooling water system will be identified on the registration statement and evaluated before the facility is covered under the general permit. Prior approval shall be obtained from the DEQ before any changes are made to the chemical and/or non-chemical treatment technology employed in the cooling water system, during the life of the permit term.

4. Notification of municipal separate storm sewer system

Where cooling water discharges to surface waters through a municipal separate storm sewer system, the permittee is required to notify the owner of the municipal separate storm sewer system of the existence of the discharge.

5. Requirement for proper O & M and routine inspection

Due to the concern of the lack of inspection and proper operation and maintenance of each cooling water system, a routine inspection is required by the facility personnel.

6. Notification levels

The permittee is required to report the discharge of any toxic pollutant from any activity that has occurred or will occur when that discharge, either on routine or non-routine basis, will exceed the highest of the listed notification levels. This condition is required by the VPDES Permit Regulation (9 VAC 25-31-200 A).

In developing the effluent limitations and special conditions the following information was reviewed: the permitting strategies, effluent limitations, treatment technologies and special conditions that are being employed by the Department of Environmental Quality for individual VPDES permits, and other states (NJ, NC, NH, ME, MA, OR, IN, WI, and AL) for general VPDES permits issued to cooling water discharges; EPA Region II Revised Guidance for Cooling Water and Storm Water Runoff; Cooling Tower Discharge Policy and Guidance Manual published by the Hampton Roads Planning District Commission; and the results of a HRSD/HRPDC cooling tower effluent characterization study.

General Permit Coverage

The general permit has a fixed term of 5 years. Every authorization under this general permit will expire at the same time and all authorizations will be renewed on the same date, provided a complete registration statement has been filed prior to the general permit's expiration date.

All persons desiring to be covered by this general permit must register with the Department by filing a registration statement and applicable fees. The registration statement shall be submitted and a notification of coverage issued prior to any discharges or other activities for which this permit is required.

Cooling water sources that are discharging to surface waters on the effective date of this general permit and that have not been issued an individual VPDES permit, are required to submit the registration statement. Existing operations with individual VPDES permits that wish to seek coverage under the proposed general permit would have to file a registration statement at least 180 days prior to the expiration date of the individual VPDES permit. For all new cooling water dischargers that propose to discharge to surface waters and that will begin activities after the effective date of this permit, the registration statement shall be filed at least 30 days prior to the commencement of construction or operation of the cooling equipment.

This general permit does not cover activities or discharges covered by an individual VPDES permit until the individual permit has expired or has been revoked. Any person conducting an activity covered by an individual permit, which could be covered by this general permit, may request that the individual permit be revoked and register for coverage under this general permit. Antibacksliding will be considered prior to granting the coverage under this general permit. Any owner or operator not wishing to be covered or limited by this general permit may make application for an individual VPDES permit, in accordance with VPDES procedures, stating the reasons supporting the request.

This general permit does not apply to any new or increased discharge that will result in significant effects to the receiving waters. The determination is made in accordance with the State Water Control Board's Antidegradation Policy contained in 9 VAC 25-260-30 of the Virginia Water Quality Standards.

All facilities that the Department believes are eligible for coverage under this general permit will be authorized to discharge under the terms and conditions of the permit after a complete registration statement is submitted, the applicable permit fee is paid and the Department sends a copy of the general permit to the applicant. If this general permit is inappropriate; for example, effluent limitations are needed for any parameters other than flow, pH, temperature and total residual chlorine, the applicant will be so notified and the requirement that an individual permit or alternate general permit is needed will remain in effect.